

REMARKS

35 U.S.C. § 103 Rejections

The Examiner has rejected claims 1-9 under 35 U.S.C. § 103(a) as being unpatentable over Chakravorty in view of Farooq. Applicant submits that these claims are patentable over the cited references.

The cited references fail to teach or suggest that a high k-value capacitor structure can be formed directly on a low k-value base structure.

Chakravorty discloses a substrate 310 having vias 315 and 327 formed therein, as well as embedded capacitors 330. The substrate 310 has a basic layer 340 in the middle, and the capacitors 330 are formed on opposing sides of the basic layer 340 in the middle. What should be noted is that each capacitor 330 has a respective dielectric layer, also referenced 340, respectively at the top and the bottom. The dielectric layers 340 of the capacitors 330 are of the same material as the basic layer 340 in the middle. All three layers 340 thus have the same dielectric constant.

Chakravorty thus fails to describe that the substrate 310 can have a basic structure with a dielectric constant having a low k-value, and capacitor structures on opposing sides, each capacitor structure having a dielectric layer having a high k-value. As such, Chakravorty also fails to describe that a high k-value capacitor structure can be formed directly on a low k-value base structure.

Farooq adds nothing to Chakravorty with respect to the high k-value capacitor structure being formed directly on the low k-value base structure.

Farooq in Figure 3B discloses a ceramic substrate 304 (having a low k-value). An interposer 302 is mounted on the ceramic substrate 304. The interposer 302 has a capacitor with a dielectric 334 having a high-k titanate content. What should be noted is that the capacitor structure 332, 334, 336 is mounted to the ceramic structure 304 by means of C4 bumps 307. The capacitor structure 332, 334, 336 is thus not formed directly on the ceramic substrate 304.

Claim 1 now specifically includes the limitation that the capacitor structures are formed directly on upper and lower sides of the base structure. Claim 1 thus includes at least one limitation that is not suggested by Chakravorty and Farooq, alone or in combination. Claim 1 can thus not be unpatentable over the combination of Chakravorty and Farooq because the combination of Chakravorty and Farooq still fails to disclose at least one limitation of claim 1.

Claims 2 and 3 depend from claim 1, and should be allowable for at least the same reasons as claim 1.

What should also be noted is that claim 4 now includes the limitation that each of the signal vias is partially formed in the portion having the low k-value material, and partially in the portion having the high k-value material. This feature is illustrated in the exemplary Figure 1, where the via 14S is formed both in the low k-value material 12 and the high k-value material 18. Neither Chakravorty nor Farooq discloses this feature. Claim 4 should thus be allowable both because it depends from the allowable claim 1 and because of the additional feature that is not disclosed in the references cited by the Examiner.

Claim 5 includes at least the limitations of claim 1 and should be allowable for at least the same reasons as claim 1.

Claims 6-9 depend from claim 5, and should be allowable for at least the same reasons as claim 5.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 1-9 under 35 U.S.C. § 103(a) as being unpatentable over Chakravorty in view of Farooq.

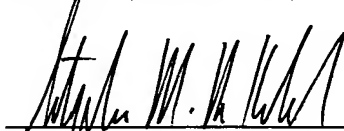
Applicant respectfully submits that the present application is in condition for allowance. If the Examiner believes a telephone conference would expedite or assist in the allowance of the present application, the Examiner is invited to call Stephen M. De Klerk at (408) 720-8300.

Please charge any shortages and credit any overages to Deposit Account No. 02-2666. Any necessary extension of time for response not already requested is hereby requested. Please charge any corresponding fee to Deposit Account No. 02-2666.

Respectfully submitted,

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